Service Manual

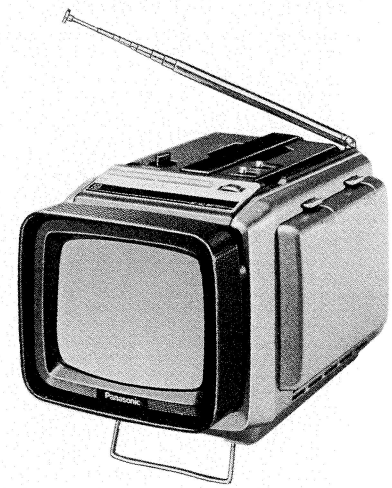
Black and White Television

TR-5030S

Chassis

No. 5A01-E

Main Manual



Specifications

Power Source:	AC: 220V, 50Hz DC: 9V
Power Consumption:	AC: 10W DC: 5W
Antenna:	UHF/VHF Monopole Antenna 75 Ohm Unbalanced Type UHF and VHF External Antenna 75 Ohm Balanced Type
Receiving Channel:	VHF CH. 2 – 12 UHF CH. 21 – 69 C.C.I.R Standard
Intermediate Frequency:	VIDEO I-F 38.9MHz SOUND I-F 33.4MHz
Picture Tube:	5" 12cm (140BXB4) 55° Deflection Aluminized
Heater Voltage:	6V
Heater Current:	75mA
High Voltage:	7.2KV at Zero Beam
Transistors:	11
Diodes:	29
IC:	8
Speaker:	8.5cm Round Type
Audio Output:	Max. 0.3W
Automatic Control Circuits:	Peak AGC (Automatic Gain Control) Saw-Tooth AFC (Automatic Frequency Control) AVR (Automatic Voltage Regulator)
Dimensions:	Height: 17.6cm Width: 17.3cm Depth: 26cm
Weight:	2.6kg

Technische Daten

Stromversorgung:	Netz: 220V, 50Hz Batterie: 9V
Stomverbrauch:	Hetz: 10W, Batterie: 5W
Antenne:	UHF/VHF Monopole Antenne 75 Ohm Asymmetrisch UHF/VHF Aussenantenne 75 Ohm Symmetrisch
Empfangskanäle:	VHF Kanäle 2 – 12 UHF Kanäle 21 – 69 Nach C.C.I.R – Norm
Zwischenfrequenzen:	Video-ZF 38.9MHz TON-ZF 33.4MHz
Bildröhre:	12cm (140BXB4) 55°Ablenkung
Heizspannung:	6V
Heizstrom:	75mA
Hochspanung:	7.2KV Unbelastet
Transistoren:	11
Dioden:	29
ICs:	8
Lautsprecher:	8.5cm, rund
NF-Ausgangsleistung:	0.3W max.
Automatische Regelschaltungen Schaltungen:	Automatische Verstärkungsreglung Automatische Kippfrequenzregelung Automatische Spannungskonstanthaltung
Abmessungen:	Höhe: 17.6cm Breite: 17.3cm Tiefe: 26cm
Gewicht:	2.6kg

National Panasonic®

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

CODE NO. ITD7906-396

CAUTION

The high voltage supply at the picture tube anode will give an unpleasant shock, but does not supply enough current to give a fatal burn or shock.

However, secondary human reaction to otherwise harmless shocks have been known to cause injury. Always discharge the picture tube anode to the receiver chassis before handling the tube.

Certain portions of the high voltage generating circuit are dangerous and extreme caution should be observed. The picture tube is highly evacuated and, if broken, glass fragments will be violently expelled.

WHEN HANDLING THE PICTURE TUBE, ALWAYS WEAR GOGGLES AND PROTECTIVE CLOTHING.

VORSICHT

Die Hochspannung der Bildröhrenanode genügt für einen unangenehmen Schlag, ist aber nicht hoch genug um Verbrennungen oder tödliche Schläge zu bewirken.

Sekundäre Verletzungen als Folge harmloser Schläge sind jedoch vorgekommen. Vor Hantieren an der Bildröhre sollte daher die Anode längere Zeit über einen Widerstand von 100K Ohm zum Chassis entladen werden.

Gewisse Abschnitte des Hochspannungskreises sind gefährlich; äusserste Vorsicht ist angebracht. Die Bildröhre steht unter Hochvakuum: beim Zerbrechen werden Glassstücke gefährlich umherfliegen.

BEIM HANTIEREN DER BILDRÖHRE IMMER SCHUTZBRILLE UND HANDSCHUHE TRAGEN!

ADJUSTMENTS — ABSTIMMUNGEN

VERTICAL HEIGHT

(1) Adjust V-Height control (VR32) to obtain a normal picture.

Adjustment should be made to extend the picture limits approximately 3/6" (5mm) beyond the top and bottom edges of the mask.

TO ADJUST THE AGC PROPERLY

(1) Set the channel selector to a station transmitting a strong signal.
(2) Turn the R-F AGC control VR19 clockwise or counter-clockwise to the point where the snow noise disappears in the picture.
(3) Check the reception on all channels.

AVR (AUTOMATIC VOLTAGE REGULATOR)

Connect a Volt meter across B+ supply line and chassis. Next make certain B+ supply voltage in +6.0V by adjusting the AVR control (VR71).

YOKE POSITION

The yoke is secured to the neck of the picture tube with a clamp and screw. To adjust the yoke and correct for picture tilt, loosen this clamp. Correct tilt and retighten the screw.

CENTERING

The picture centering device consists of two rings located at the rear of the yoke assembly. Each ring has a tab for ease of adjustment. The tabs should be rotated and moved towards or away from each other until the picture is properly centered on the screen of the picture tube.

BILDHÖHE

(1) Bildhöhenregler (VR32) so einstellen, daß das Bild unverzerrt dasteht.

Die justierung ist so vorzunehmen dass die Bildbegrenzung ca 5mm vom oberen und unteren Ende der Maske bleibt.

KORREKTE EINSTELLUNG DES AGC

(1) Kanalwähler auf einen starken Sender einstellen.
(2) TF AGC Regler VR19 so einstellen, dass ein klares und rauschfreies Bild entseht.
(3) Den Empfang auf allen Kanälen prüfen.

AVR (AUTOMATISCHE SPANNUNGSREGELUNG)

Einen Voltmeter über B+ versorgung und Chassis anschiessen. Darauf achten dass B+ Versorgungsspannung +6.0V ist, indem man den AVR Regler justiert (VR71).

POSITION DER ABLENKEINHEIT

Die Ablenkeinheit ist mittels einer Schelle und Schraube am Hals der Bild Röhre befestigt. Um die Ablenkeinheit einzustellen und eine Korrektur der Bildlage vorzunehmen, ist die Schelle zu lösen und nach vorgenommener Korrektur mit Hilfe der Schraube wieder zu Befestigen.

ZENTRIEREN

Die Bildzentrierungseinheit besteht aus zwei Ringen die sich am Ende der Ablenkeinheit befinden.
Jeder Ring hat einen Streifen um die Einstellung zu Vereinfachen. Die Streifen sind zu oder von einander zu bewegen bis das Bild sich genau in der Mitte der Bildröhre befindet.

-DISASSEMBLY INSTRUCTION——DEMONTAGE ANLEITUNG—

CABINET REMOVAL

1. Remove 6 screws Ⓐ as in Fig. 1, 2.
2. Pull the cabinet towards you.

MAIN BOARD REMOVAL

1. Disconnect clampers and couplers to the main board.
2. Pull the main board toward you.

TUNER BOARD REMOVAL

1. Remove 3 screws Ⓑ and pull the escutcheon towards you in Fig. 3.
2. Disconnect clampers and couplers to the tuner board.
3. Remove 2 screws Ⓒ and pull the tuner board towards you in Fig. 3.

ABNEHMEN DES GEHÄUSES

1. Die 6 Schrauben Ⓐ wie in Abb. 1 und 2 entfernen.
2. Die Gehäuse nach vorne ziehen und abnehmen.

AUSBAU DER HAUPTTAFEL

1. Klemmschaltungen und Koppler von der Haupttafel trennen.
2. Haupttafel nach vorne herausziehen.

AUSBAU DER TUNER PLATTE

1. Die 3 Schrauben Ⓑ entfernen und die Verzierungsleiste nach vorne ziehen, wie in Abb. 3 gezeigt.
2. Klmmschaltungen und Koppler von der Tuner platte trennen.
3. Die 2 Schrauben Ⓒ entfernen und die tuner platte nach vorne herausziehen, wie in Abb. 3 gezeigt.

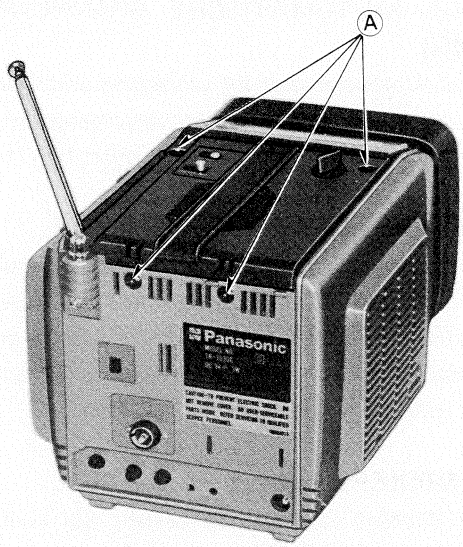


Fig. 1 Abb. 1

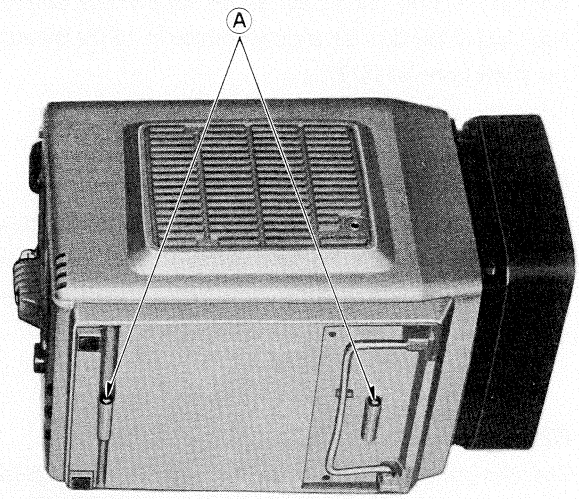


Fig. 2 Abb. 2

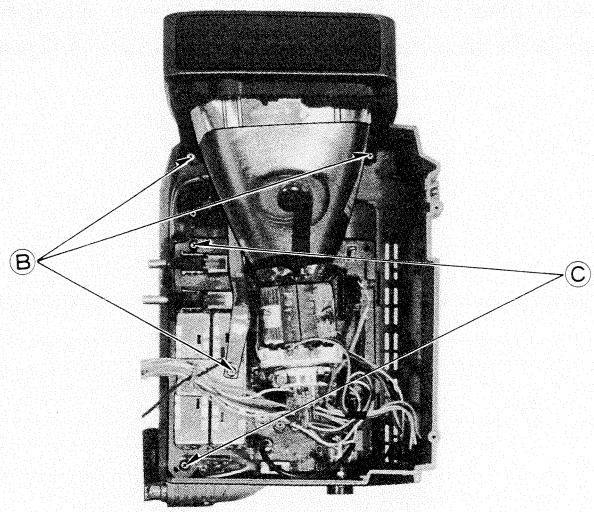


Fig. 3 Abb. 3

——VIDEO I-F ALIGNMENT——BILD-ZF ADSTIMMUNG——

EQUIPMENT CONNECTION

Disconnect the jumper lead (J711, J712).

Power Supply

Supply +6.0V to TP91.

Oscilloscope, Sweep Generator. Marker Generator.

Connect as shown in Fig. 4.

VERBINDUNGSPLAN DER AUSRÜSTUNG

Brücke (J711, J712). entfernen.

Netzzufuhr

Zufuhr +6.0V DC an TP91.

Oszilloskop, Wobbel Generator. Marken Generator.

Verbindung wie in Abb. 4.

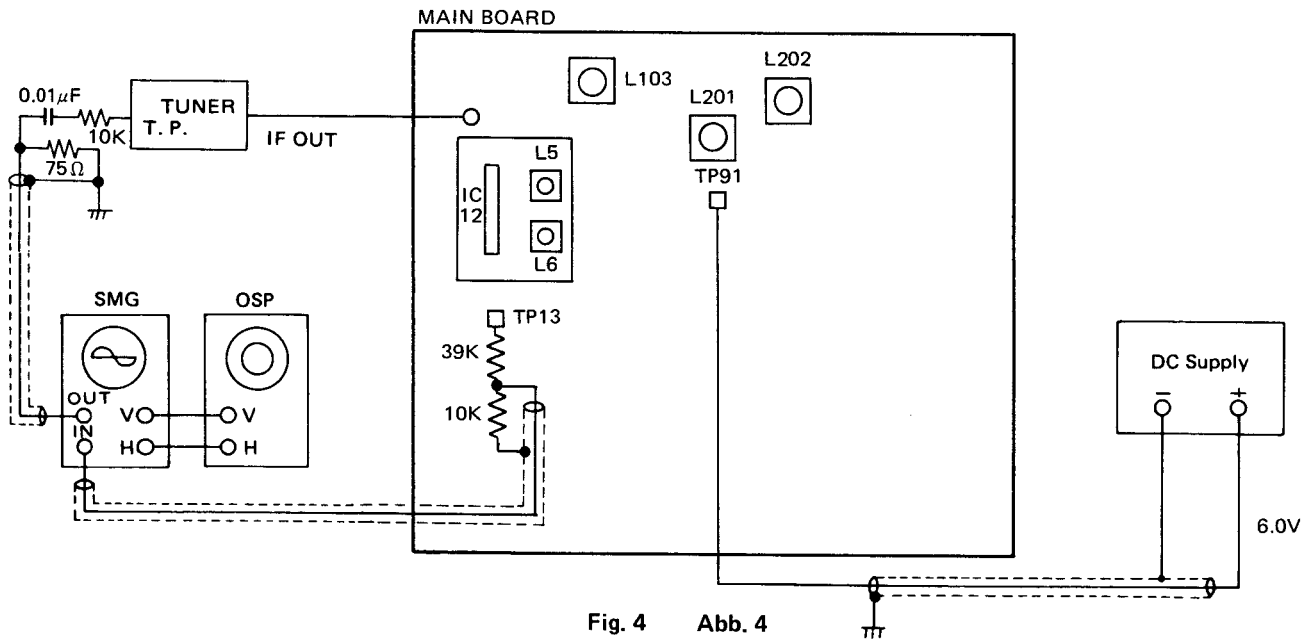


Fig. 4 Abb. 4

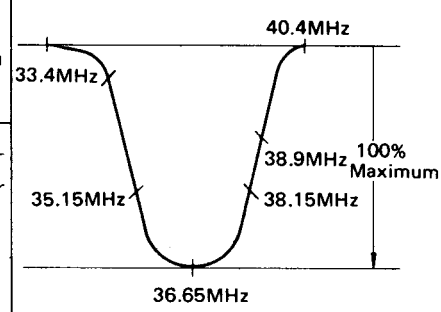
STEP	ALIGNMENT	WAVEFORM KURVENFORM	Schritt	ABGLEICHEN
1	Adjust L103 for the minimum gain at 40.4MHz marker position as in Fig. 5.		1	L103 auf Maximum bie 40.4MHz Markeirung wie in Abb. 5.
2	Adjust L105 and L106 for the maximum gain at 36.65MHz marker position as in Fig. 5.		2	L105 und L106 auf Maximum bei 36.65MHz Markeirung wie in Abb. 5.

Fig. 5 Abb. 5

—SOUND I-F ALIGNMENT (5.5 MHz)—TON-ZF ABSTIMMUNG—

EQUIPMENT CONNECTION

Disconnect the jumper lead (J711, J712).

Power Supply

Supply +6.0V to TP91.

Oscilloscope, Sweep Generator. Marker Generator.

Connect shown in Fig. 6.

Set 5.5/6.0MHz selector switch to 5.5MHz position.

VERBINDUNGSPLAN DER AUSRÜSTUNG

Brücke (J711, J712). entfernen.

Netzzufuhr

Zufuhr +6.0V DC an TP91.

Oszilloskop, Wobbel Generator. Marken Generator.

Verbindung wie in Abb. 6.

5.5/6.0MHz Schalter auf 5.5MHz drehen.

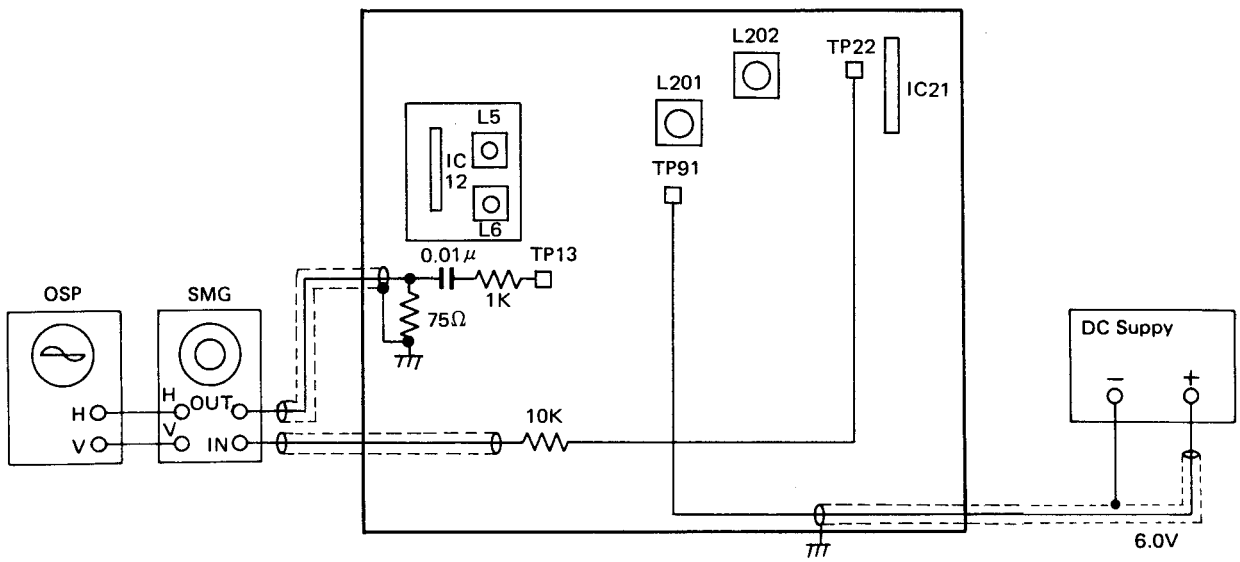
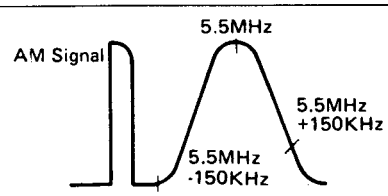
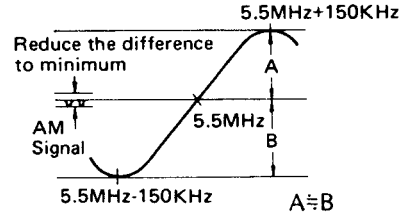


Fig. 6 Abb. 6

STEP	ALIGNMENT	WAVEFORM KURVENFORM	Schritt	ABGLEICHEN
1	Adjust both L201 and L202 for the maximum gain at 5.5MHz AM signal as in Fig. 7.	 **Fig. 7 Abb. 7**	1	L201 und L202 Beide auf Maximum bei 5.5MHz amplituden modulation singla wie in Abb. 7.
2	Adjust L202 to reduce the difference of AM signal as in Fig. 8.	 **Fig. 8 Abb. 8**	2	L202 so einstellen, do die Differenz zwischen amplituden modulation signal in Abb. 8.
3	Adjust L202 until the 5.5MHz marker is at the center of slanted line as in Fig. 8.		3	L202 so einstellen bis 5.5MHz Markierung in der Mitte der S Kurve ist wie in Abb. 8.

—SOUND I-F ALIGNMENT (6.0MHz)—TON-ZF ABSTIMMUNG—

EQUIPMENT CONNECTION

Disconnect the jumper lead (J711, J712).

Power Supply

Supply +6.0V to TP91.

Oscilloscope, Sweep Generator. Marker Generator.

Connect shown in Fig. 9.

Set 5.5/6.0MHz selector switch to 6.0MHz position.

VERBINDUNGSPLAN DER AUSRÜSTUNG

Brücke (J711, J712). entfernen.

Netzzufuhr

Zufuhr +6.0V DC an TP91.

Oszilloskop, Wobbel Generator. Marken Generator.

Verbindung wie in Abb. 9.

5.5/6.0MHz Schalter auf 6.0MHz drehen.

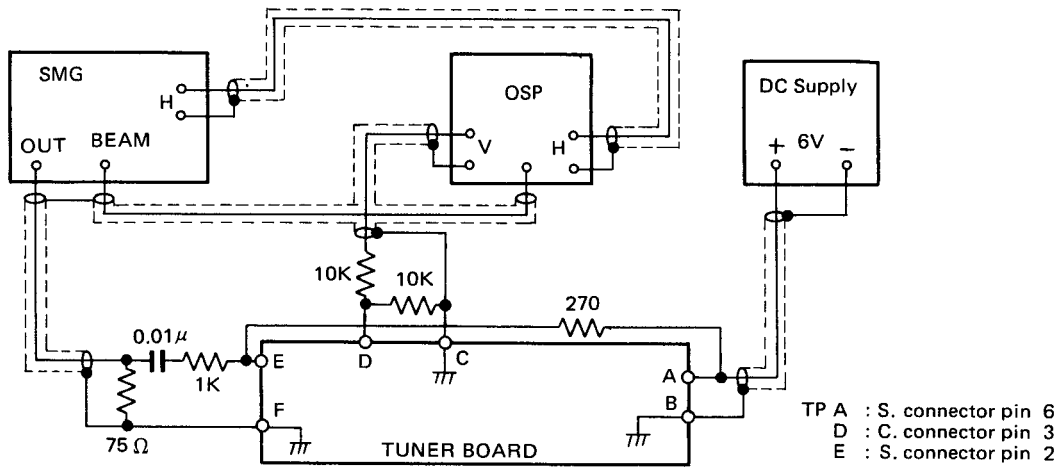
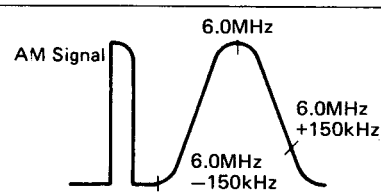
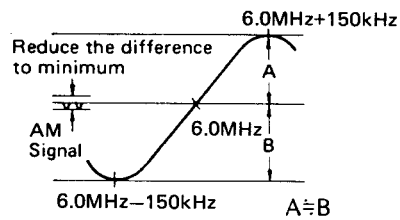


Fig. 9 Abb. 9

STEP	ALIGNMENT	WAVEFORM KURVENFORM	Schritt	ABGLEICHEN
1	Adjust both L251 and L252 for the maximum gain at 6.0MHz AM signal as in Fig. 10.	 **Fig. 10 Abb. 10**	1	L251 und L252 Beide auf Maximum bei 6.0MHz amplituden modulation singla wie in Abb. 10.
2	Adjust L252 to reduce the difference of AM signal as in Fig. 11.	 **Fig. 11 Abb. 11**	2	L252 so einstellen, do die Differenz zwischen amplituden modulation signal in Abb. 11.
3	Adjust L252 until the 6.0MHz marker is at the center of slanted line as in Fig. 11.		3	L252 so einstellen bis 6.0MHz Markierung in der Mitte der S Kurve ist wie in Abb. 11.

TV TUNING ALIGNMENT

1. Set TV Band SW to UHF position.
2. Turn the TV tuning knob fully counterclockwise and set indicator to start point as in fig. 12.
3. Connect a voltmeter between TP95 and ground.
4. Fully turn VR94 in the direction to incredse the voltage at TP95 and adjust VR95 to obtain 10 ± 0.1V.
5. Set indicator to ch58 and receive a picture.
6. Adjust VR93 to obtain the best picture.
7. Set TV Band SW to VHF position.
8. Set indicator to ch5.
9. Fully turn VR95 in the direction to incredse the voltage at TP95.
10. Adjust VR94 to obtain 4.5 ± 0.1V.
11. Adjust VR95 to obtain the best picture.
12. Set indicator to ch4 and adjust VR96 to obtain the lest picture.

Note: The following conditions are required.

VHF: To obtain the best picture at ch2, ch4, ch5 and ch10 deviation of ± 5ch acceptable.

UHF: To obtain the best picture at ch21, ch25 and ch58, deviation ± 2ch from the correct tuning indication is acceptable.

ABGLEICH DER FERNSEHTUNER

1. TV-Bandwahlschalter in die UHF-Position stellen.
2. Abstimmknopf in Gegenuhrzeigersinn drehen und Anzeiger auf die Ausgangsposition abtimmen, wie in Abb. 12.
3. Ein Voltmeter zwischen TP95 und Erdung anschließen.
4. VR94 bis zum Auschlag in die Richtung zum Erhöhen Spannung an TP95 und VR95 auf 10 ± 0.1V abstimmen.
5. Anzeiger auf ch58 einstellen, und ein Bild empfangen.
6. VR93 auf besten Bildempfang abstimmen.
7. TV-Bandwahlschalter in die VHF-Position stellen.
8. Anzeiger auf ch5 einstellen.
9. VR95 bis zum Auschlag in die Richtung zum Erhöhen Spannung an TP95.
10. VR94 auf 4.5 ± 0.1V abstimmen.
11. VR95 auf besten Bildempfang abstimmen.
12. Anzeiger auf ch4 einstellen und VR96 auf besten Bildempfang abstimmen.

Anmerkung: Die folgenden Bedingungen müssen erfüllt werden.

VHF: Zur Erzielung besten Bildempfangs bei CH2, CH4, CH5, CH10, ist ± 0.5CH Abweichung, von der korrekten Anzeigeposition Zulässig.

UHF: Zur Erzielung besten Bildempfangs bei CH21, CH25, CH58 ist ± 3CH Abweichung von der Korrekten Anzeigeposition ist zulässig.

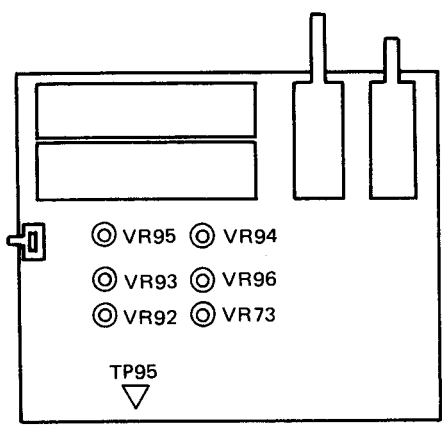
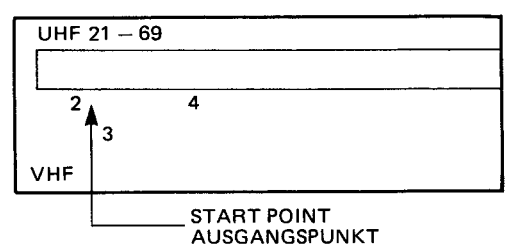


Fig. 12 Abb. 12



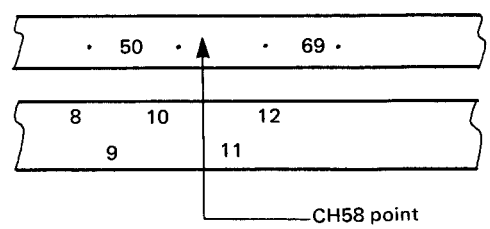
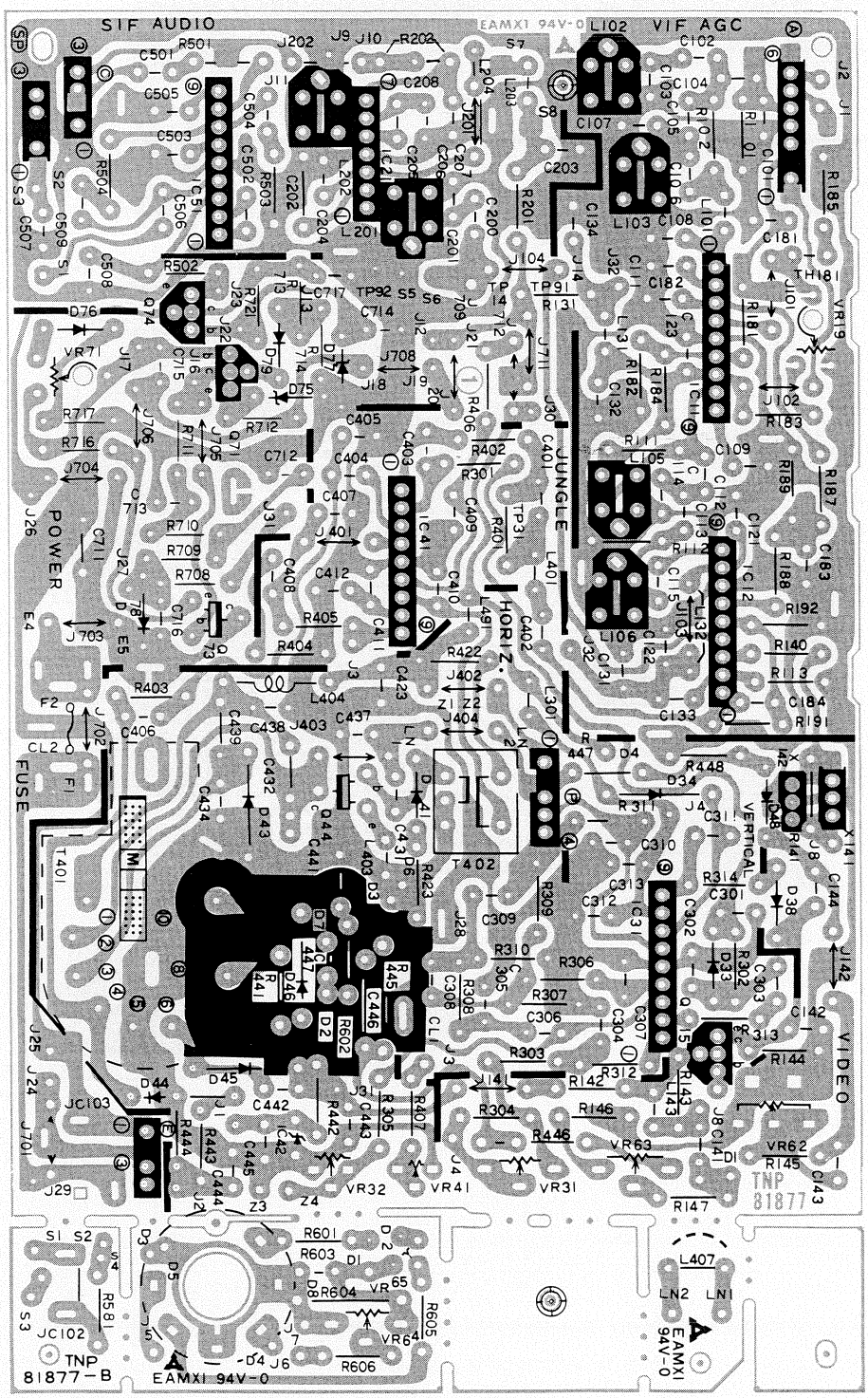


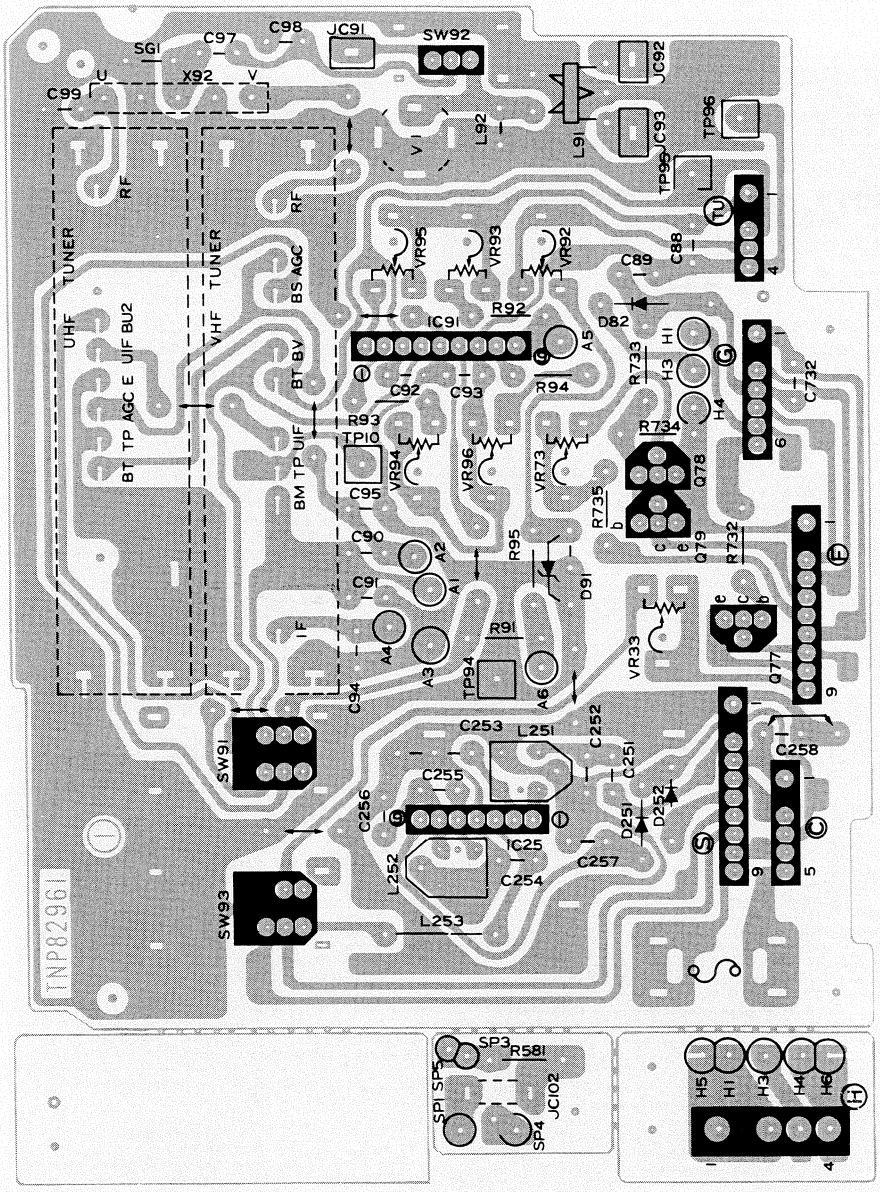
Fig. 13 Abb. 13

CONDUCTOR VIEWS

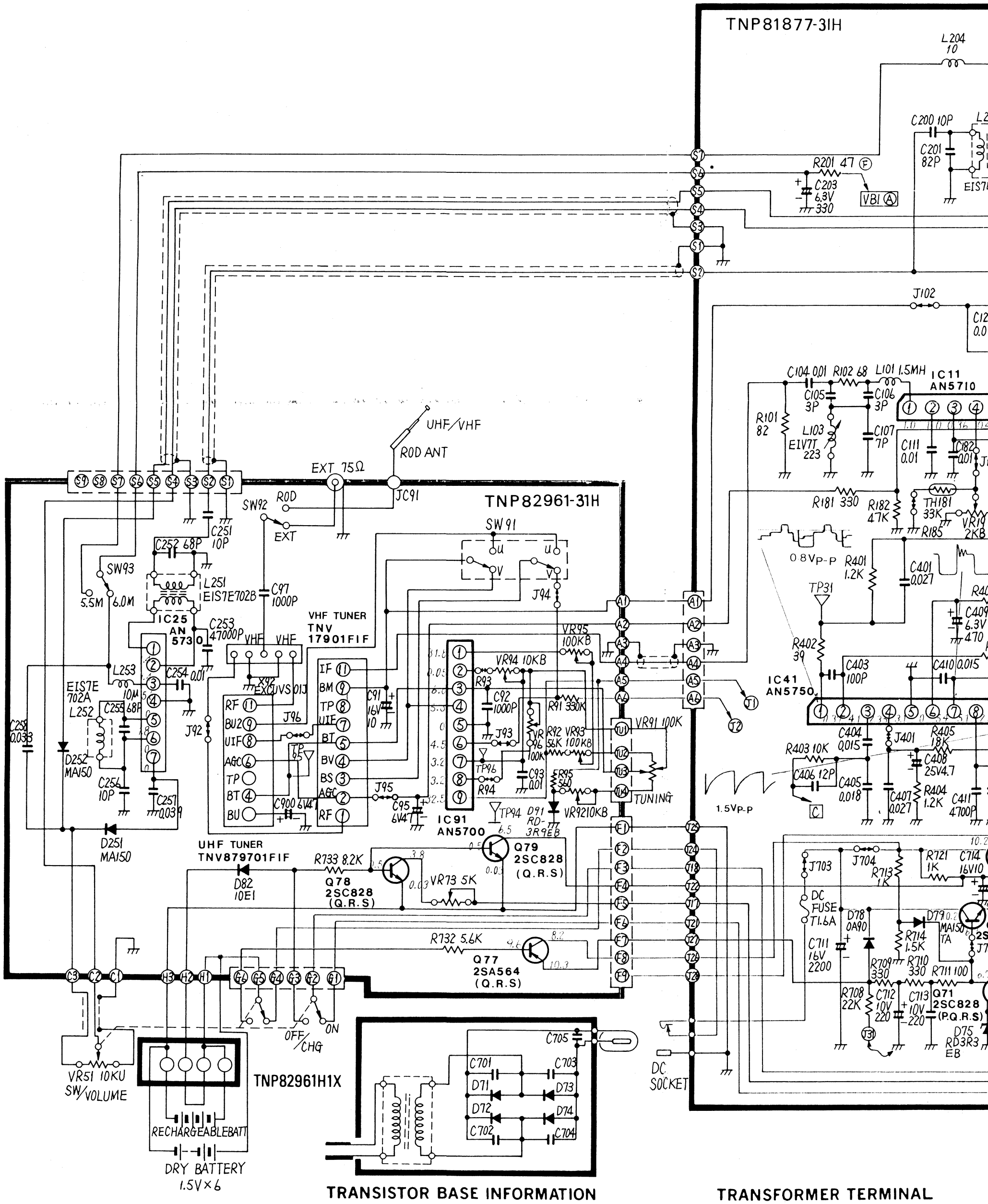
MAIN BOARD TNP81877-31H



TUNER BOARD
TNP82961-31H, TNP82961H1X, TNP82961H1Y



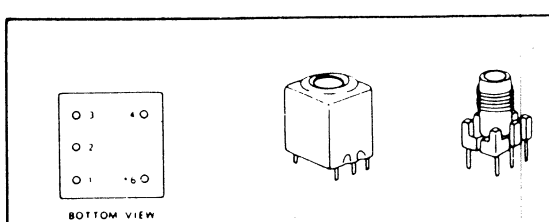
SCHEMATIC DIAGRAM FOR MODEL



TRANSISTOR BASE INFORMATION

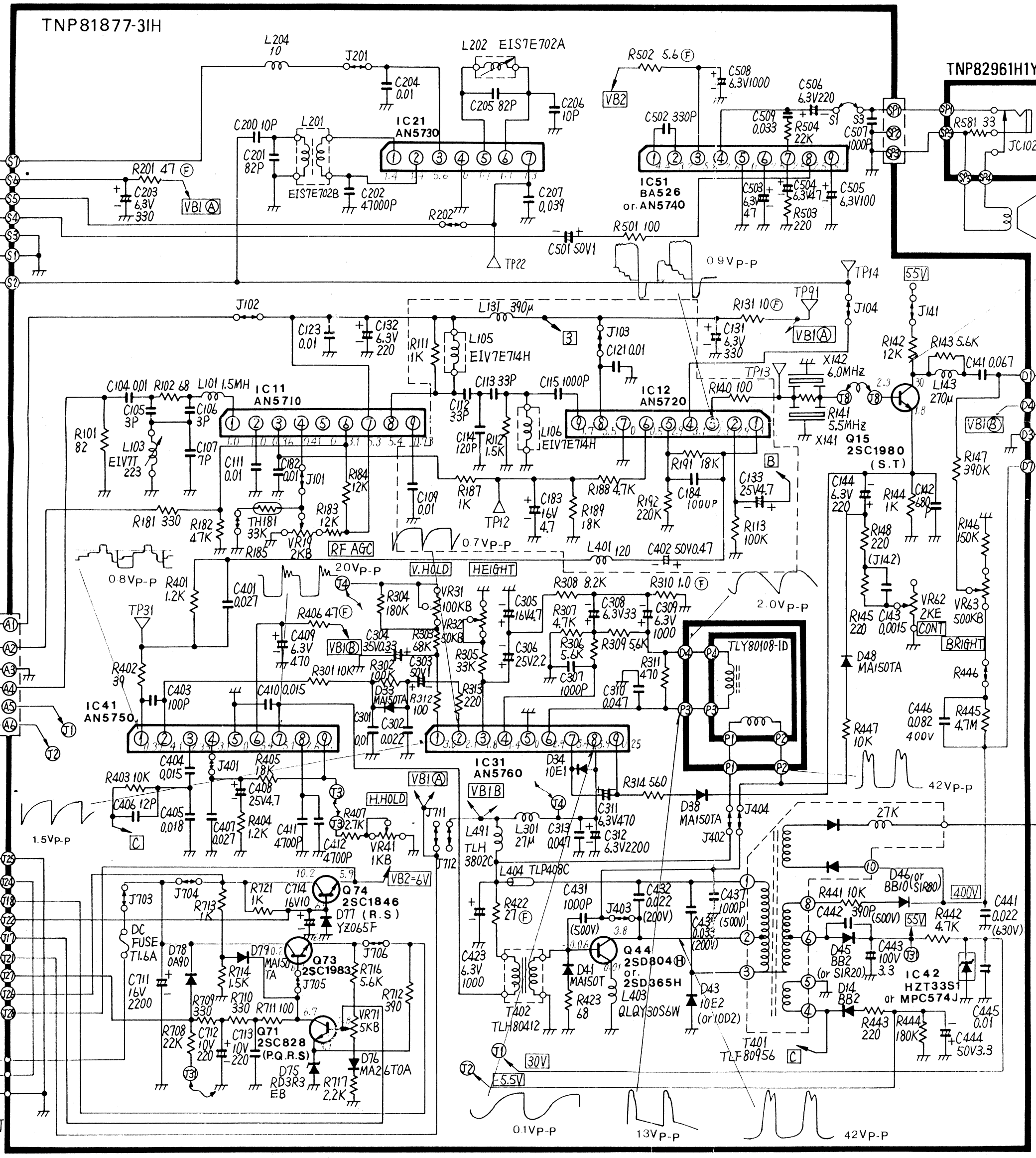
2SC1556	2SC1025MT	2SA564A 2SC1317 2SA719 2SC828 2SC1318 2SC829C 2SC828A 2SC1359C	2SC1686 2SC1687
2SC563	2SD389BLB	2SC761 2SC948	2SC645

TRANSFORMER TERMINAL INFORMATION

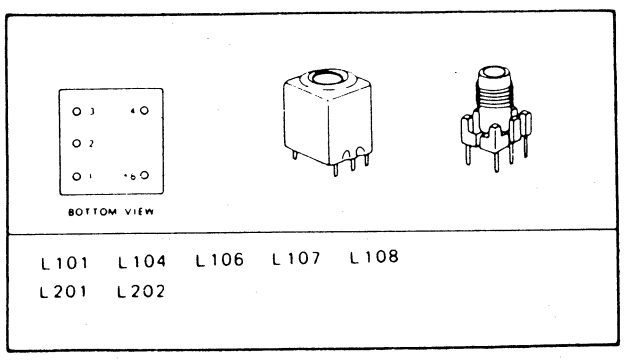


L101 L104 L106 L107 L108
L201 L202

IAGRAM FOR MODEL TR-5030S (CHASSIS NO. 5A01-E)



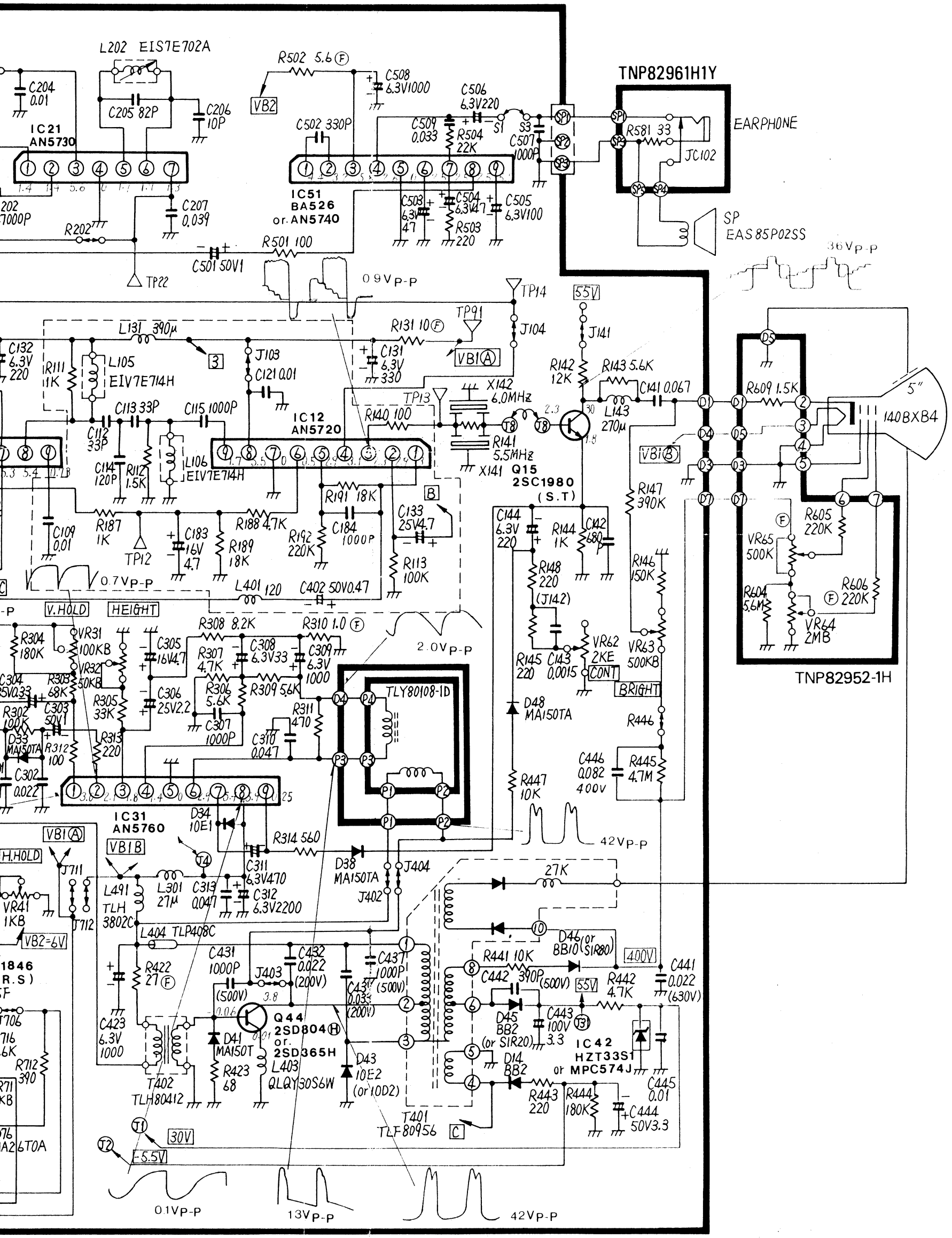
TRANSFORMER TERMINAL INFORMATION



NOTE

1. RESISTOR
   All resistors are carbon 1/4W resistor, unless otherwise noted the following marks.
   Unit of resistance is OHM (Ω). (K=1,000, M=1,000,000)
   - △ : Solid resistor
   - ● : Metal oxide resistor
   - □ : Wire wound resistor
   - : Thermistor
   - : Fuse resistor
   - Ⓕ : Non Flame resistor
2. CAPACITOR
   All capacitors are ceramic 50V capacitor, unless otherwise noted the following marks.
   Unit of capacitances is μF, unless otherwise noted.
   - Ⓜ : Polyester capacitor
   - Ⓢ : Polystylene capacitor
   - : Electrolytic capacitor
3. COIL
   Unit of inductance is μH
4. TEST POINT
   : Test point position.
5. VOLTAGE MEASUREMENT
   Voltage is measured by a VTVM receiving nor
   the maximum position.
6. Number in red circie indicates waveform numbe
7. When arrow mark ( ) is found, connection i
   of an arrow.
8. When schematic diagram of a board is describ
   encircled with dotted line (- - -).
9. This schematic diagram is the latest at the ti
   without notice.

5030S (CHASSIS NO. 5A01-E)



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   Unit of resistance is OHM (Ω). (K=1,000, M=1,000,000)
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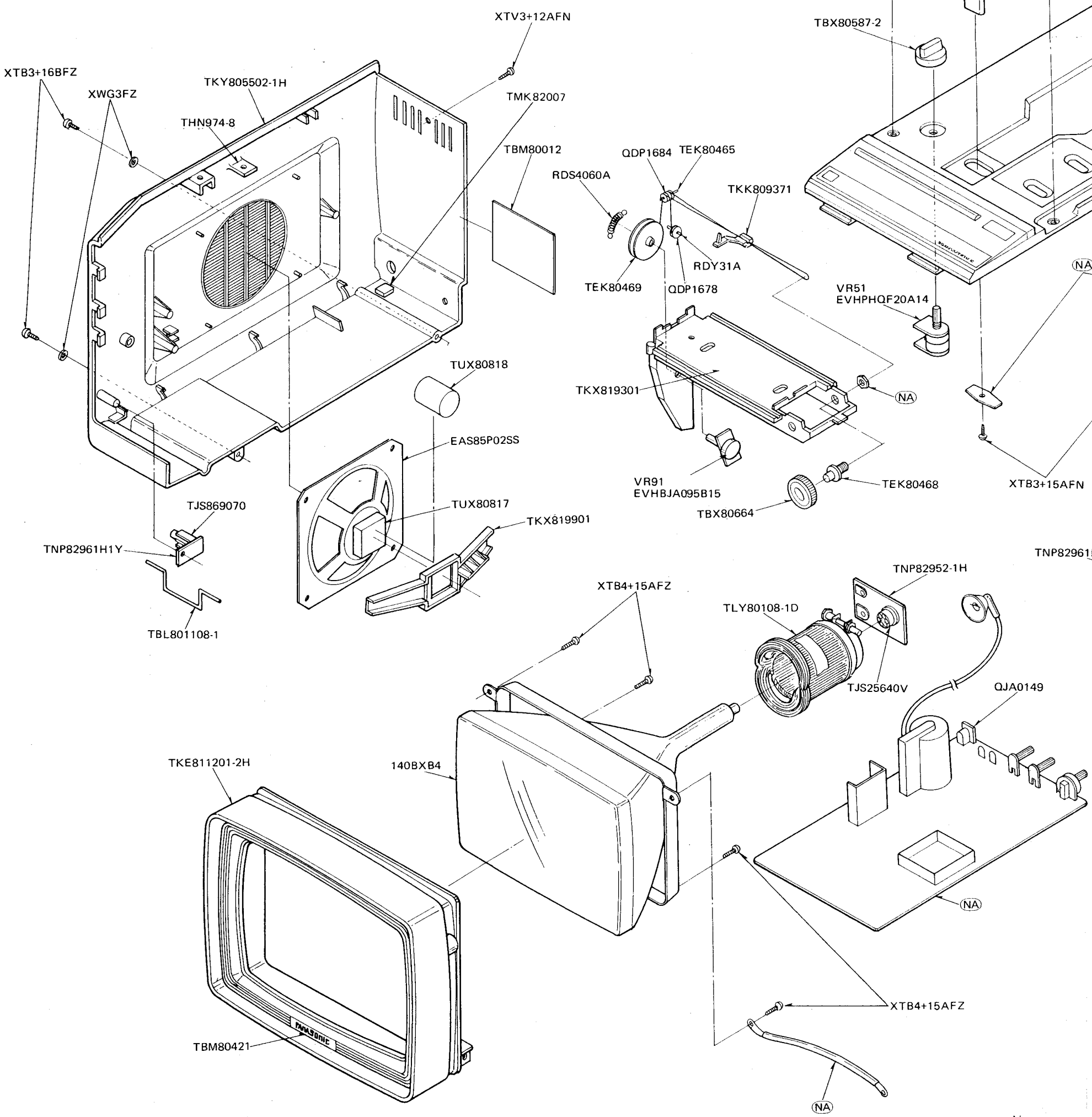
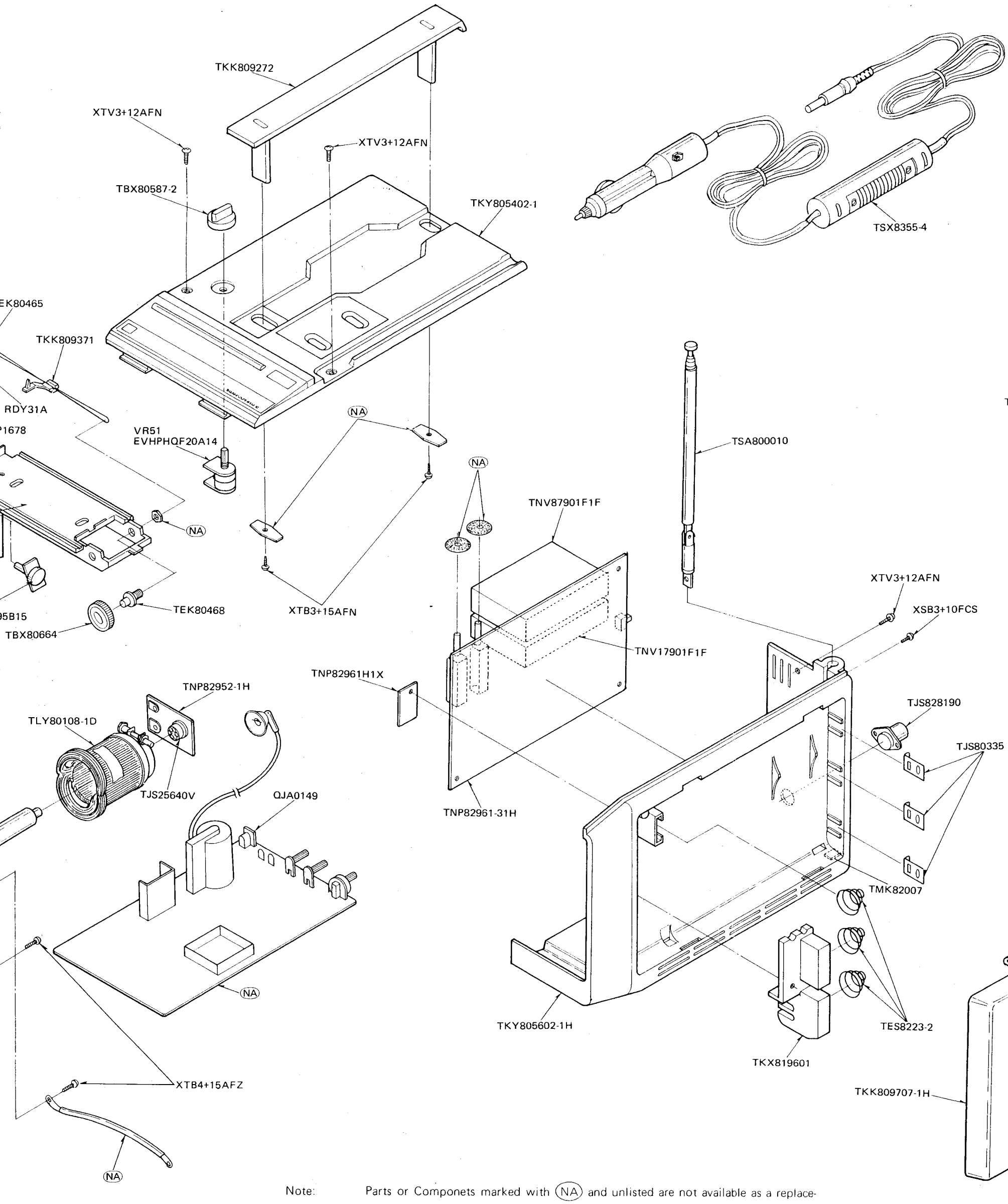
   - : Fuse resistor
   - Ⓕ : Non Flame resistor
2. CAPACITOR
   All capacitors are ceramic 50V capacitor, unless otherwise noted the following marks.
   Unit of capacitances is µF, unless otherwise noted.
   - Ⓜ : Polyester capacitor
   - Ⓢ : Polystylene capacitor
   - : Electrolytic capacitor
3. COIL
   Unit of inductance is µH
4. TEST POINT
   - ▽ : Test point position.
5. VOLTAGE MEASUREMENT
   Voltage is measured by a VTVM receiving normal signal, when all controls are set to the maximum position.
6. Number in red circie indicates waveform number.
7. When arrow mark (⌐) is found, connection is easily found along with the direction of an arrow.
8. When schematic diagram of a board is described in more than two places, they are encircled with dotted line (– - –).
9. This schematic diagram is the latest at the time of printing and subject ot change without notice.



Note:

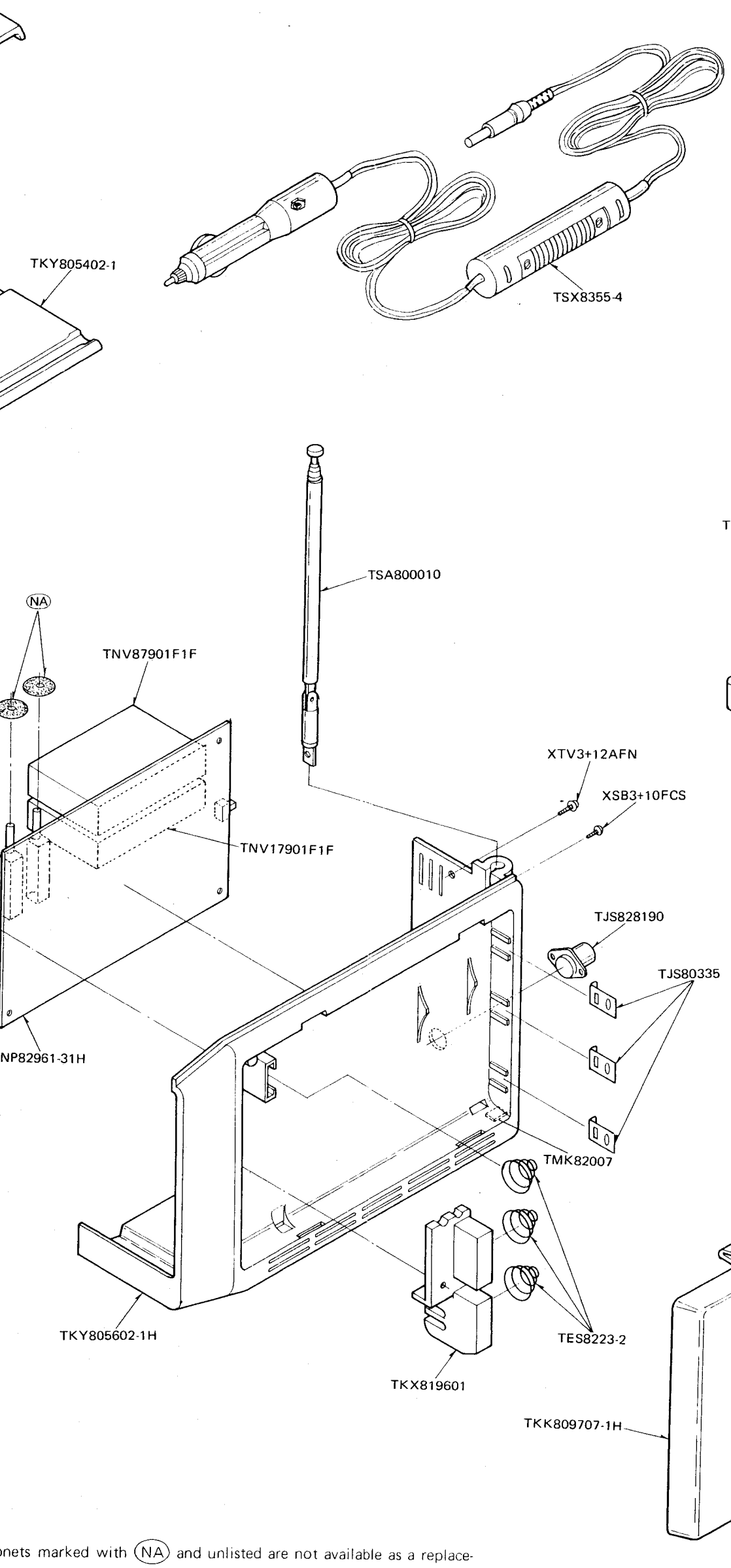
Bemerkung:

EXPLODED VIEW



Note: Parts or Componets marked with (NA) and unlisted are not available as a replacement part.

Bemerkung: Mit (NA) gekennzeichnete Teile order bauelemente und Teile die nicht in der Ersatzteilliste aufgeführt sind, sind nicht als Ersatzteile erhältlich.



onets marked with (NA) and unlisted are not available as a replace-

ennzeichnete Teile order bauelemente und Teile die nicht in der fgeführt sind, sind nicht als Ersatzteile erhältlich.

REPLACEMENT PARTS LIST — RESATZTEIL LISTE

Note: Main board (TNP81877-31H) is not available as a complete printed circuit board.

Bemerkung: TNP81877-31H die gedruclcte schaltung ist als komplet bestücket einheit lieferber.

Ref. No.	Part No.	Description
	CABINET AND MAIN CHASSIS PARTS	
	TKY805402-1	Upper Cabinet Complete
	TKY805502-1H	Left Side Cabinet Complete
	TKY805602-1H	Right Side Cabinet Complete
	TKE811201-2H	Escutcheon Complete
	TKK809272	Handle
	TKK809371	Dial Guide
	TKK809707-1H	Battery Cover
	TKX819301	Indicator Bracket
	TKX819601	Battery Spring Bracket
	TKX819901	Speaker Holding Bracket
	TBM80012	Model Plate
	TBM80421	Panasonic Badge
	TBL801108-1	Set Leg
	TBX80587-2	ON-OFF Volume Knob
	TBX80664	Tuning Knob
	TEK80465	Roller Shaft (Long)
	TEK80468	Tuning Shaft
	TEK80469	TV Wire Hanger Pulley
	TES8223-2	Battery Spring
	TMK82007	Set Leg (Rubber)
	RDS4060A	Wire Hanger Spring
	QDP1678	Roller (Big)
	QDP1684	Roller (Small)
	RDY31A	Roller Shaft (Short)
	TUX80817	Speaker Bracket (A)
	TUX80818	Speaker Bracket (B)
	140BXB4	Picture Tube
	TLY80108-1D	Deflection Yoke
	EAS85P02SS	Speaker
	TSA800010	Rod Antenna
	TY-AC29-1	AC Adaptor
	TSX8355-4	Car Cord
	TNP82952-1H	Picture Tube Socket Circuit Board Complete
	TNP82961-31H	Tuner Circuit Board Complete
	TNP82961H1X	Connector Circuit Board Complete
	TNP82961H1Y	Earphone Socket Circuit Board Complete
VR51	EVHPHQF20A14	ON-OFF Volume Control 10KΩA
VR91	EVHBJA095B15	Tuning Control 100KΩB
	TJC80335	Battery Terminal
	TXAJT3P236	3-P Mini. Connector Ass'y (Volume Control)
	TXAJT4P082	4-P Mini. Connector Ass'y (Deflection Yoke)
	TXAJT4P101	4-P Mini. Connector Ass'y (Tuning Control)
	TXAJT6P049	4-P Mini. Connector Ass'y (Volume Control)
	TJS828190	75Ω Terminal
	TPC812261	Outer Carton
	TXAPD15030	Filler Complete
	TPE84042-1	Set Cover
	TQB811276	Fan Bag With Earphone
	TQB810276H	Instruction Book
	XEHT3YDA-B1	Earphone
	SCREWS & WASHERS	
	XTV3+16BFZ	Left Side Cabinet Mounting Screw
	XWG3FZ	Left Side Cabinet Mounting Washer
	THN974-8	Spead Nut
	XTV3+12AFN	Escutcheon Mounting Screw
	XSB3+10FCS	Rod Antenna Mounting Screw
	XTB3+15AFN	Handle Mounting Screw
	XTB4+15AFZ	Picture Tube Mounting Screw
	TNP82952-1H	
	TJS25640V	Picture Tube Socket
R601	ERD25TJ152	Carbon 1.5KΩ ± 5% 1/4W
R604	ERC12GJ565	Solid 5.6MΩ ± 5% 1/2W
R605	ERD25FJ224	Carbon 220KΩ ± 5% 1/4W
R606	ERD25FJ224	Carbon 220KΩ ± 5% 1/4W
VR64	EVTS3MA00B26	Focus Control 2MΩB
VR65	EVNM4AA00B55	Sub Bright. Control 500KΩB
	TNP82961H1Y	
	TJS869070	Earphone Socket
R581	ERD25TJ330	Carbon 33Ω ± 5% 1/4W
	TNP82961-31H	
	TUNERS	
	TNV17901F1F	VHF Tuner
	TNV87901F1F	UHF Tuner
	I.C	
IC25	AN5730	Sub Sound-IF Amp./Det.
IC91	AN5700	Channel Selection
	TRANSISTORS	
Q77	2SA564A	AVR
Q78	2SC828A	AVR
Q79	2SC828A	AVR
	DIODES	
D82	TVS10E1	Rectifier
D91	TVSRD3R9EC	Zenner
D251	MA150	Back Current Prevention
D252	MA150	Back Current Prevention
	COILS & TRANSFORMERS	
L251	EIS7E702B	Sound-IF Input Coil
L252	EIS7E702A	Sound-IF Det. Transformer
L253	TLU100K106C	Peaking Coil
	CAPACITORS	
C91	ECEA1CS100	Electrolytic 10μF 16V
C92	ECKD1H102KB2	Ceramic 1000pF ± 10% 50V
C93	ECKD1H103PF2	Ceramic 0.01μF +100%,−0% 50V
C95	ECEA0JS470	Electrolytic 47μF 6.3V
C97	ECKD2H102KB2	Ceramic 1000pF ± 10% 500V

Ref. No.	Part No.	Description
C251	ECCD1H100DC	Ceramic 10pF ± 0.5pF 50V
C252	ECCD1H680JS	Ceramic 68pF ± 5% 50V
C253	ECCD1H473ZF	Ceramic 0.047μF +80%,–20% 50V
C254	ECKD1H103PF	Ceramic 0.01μF +100%,–0% 50V
C255	ECCD1H680JS	Ceramic 68pF ± 5% 50V
C259	ECFWD333KBY	Ceramic 0.033μF ± 10% 25V
C256	ECCD1H100DC	Ceramic 10pF ± 0.5pF 50V
C257	ECFWD393KBY	Ceramic 0.039μF ± 10% 25V
C900	ECEA0JS470	Electrolytic 47μF 6.3V
	RESISTORS	
R91	ERD25TJ334	Carbon 330KΩ ± 5% 1/4W
R92	ERD25TJ223	Carbon 22KΩ ± 5% 1/4W
R94	ERD25TJ473	Carbon 47KΩ ± 5% 1/4W
R95	ERD25TJ561	Carbon 560Ω ± 5% 1/4W
R732	ERD25TJ562	Carbon 5.6KΩ ± 5% 1/4W
R733	ERD25TJ822	Carbon 8.2KΩ ± 5% 1/4W
R735	ERD25TJ272	Carbon 2.7KΩ ± 5% 1/4W
	CONTROLS	
VR73	EVNK4AA00B53	AVR 5KΩB
VR92	EVNK4BA00B14	Sub Tuning Control 10KΩB
VR93	EVNK4AB00B15	Sub Tuning Control 100KΩB
VR94	EVNK4BA00B24	Sub Tuning Control 20KΩB
VR95	EVNK4BA00B15	Sub Tuning Control 100KΩB
VR96	EVNK4BA00B15	Sub Tuning Control 100KΩB
	OTHER PARTS	
X92	EXCUVS01J	U/V Signal Separator
SW91	TSE80723	U/V Selector Switch
SW92	ESD1493	Antenna Selector Switch
SW93	TSE80721	SIF Selector Switch
	TJS848060	Phono. Pin Terminal
	TJS868250	3-P Mini. Connector Plug
	TJS868260	4-P Mini. Connector Plug
	TJS868280	6-P Mini. Connector Plug
	TJS868310	9-P Mini. Connector Plug
	TXAJT3P220	3-P Mini. Connector Ass'y
	TXAJT6P054A	6-P Mini. Connector Ass'y
	VHF TUNER PARTS	
Q1	2SC2348A	RF Amp. Transistor
Q2	2SC2348B	Mix. Transistor
Q3	2SC1215	OSC. Transistor
D1	MA56	Switching Diode
D2	MA56	Switching Diode
D3	MA320G1NR	Vari. Cap. Diode
D4	MA320G1NR	Vari. Cap. Diode
D5	MA56	Switching Diode
D6	MA56	Switching Diode
D7	MA56	Switching Diode
D8	MA320G1NR	Vari. Cap. Diode
	UHF TUNER PARTS	
Q1	2SC2360	RF Amp. Transistor
Q2	2SC288A-5BE	OSC. Transistor
Q3	2SC2348A	IF Amp.
D1	MA320B1NR	Vari. Cap. Diode
D2	MA320B1NR	Vari. Cap. Diode

Ref. No.	Part No.	Description
D3	MA320B1NR	Vari. Cap. Diode
D4	TVS1SS86-02	Mix. Diode
	TNP81877-31H	
	I.C	
IC11	AN5710	Video-IF AGC
IC12	AN5720	Video-IF Det./Video Amp.
IC21	AN5730	Sound-IF Amp./Det.
IC31	AN5760	Vert. OSC./Amp./Output
IC41	AN5750	Sync. Sep. Amp./Horiz. AFC, OSC. Drive
IC42	TVSMPC574J	Zenner
IC51	TVSBA526	Audio
	TRANSISTORS	
Q15	2SC1980	Video Output
Q44	2SD365HP	Horiz. Output
Q71	2SC828A	AVR
Q73	2SC1983	AVR
Q74	2SC1846	AVR
	DIODES	
D33	MA150	Vert. Sync.
D34	TVS10E1	Rectifier
D38	MA150	Vert. Blanking
D41	MA150	Horiz. Output Transistor Protector
D43	TVS10E2	Damper
D44	TVSBB2A	Rectifier
D45	TVSBB2A	Rectifier
D46	TVSBB10	Rectifier
D48	MA150	Horiz. Blanking
D75	TVSRD3R3EB	AVR Zenner
D76	MA26	AVR Protector
D77	TVSYZ065F	AVR
D78	OA91	AVR
D79	MA150	AVR
	COILS & TRANSFORMERS	
L101	TLU1R5M106S	Peaking Coil 1.5μH ± 10%
L103	EIV7T223	Sound Trap Coil
L105	EIV7E718H	Video-IF Transformer
L106	EIV7E718H	Video-IF Transformer
L131	TLU391K106S	Peaking Coil 390μH ± 10%
L143	TLU121-999	Peaking Coil 120μH ± 10%
L201	EIS7E702B	Sound-IF Input Coil
L202	EIS7E702A	Sound-IF Det. Transformer
L203	TLU100K106C	Peaking Coil 10μF ± 10%
L301	TLU270K106S	Peaking Coil 27μF ± 10%
L401	TLU121K106S	Peaking Coil 120μH ± 10%
L403	QLQY30S6W	Peaking Coil
L404	TLP408	Choke Coil
L491	TLH3802C	Horiz. Choke Coil
T401	TLF80956	Flyback Transformer
T402	TLH80412	Horiz. Drive Transformer
	CAPACITORS	
C104	ECKD1H103PF2	Ceramic 0.01μF +100%,–0% 50V
C105	ECCD1H030CC	Ceramic 3pF ± 0.25pF 50V

Ref. No.	Part No.	Description		
C106	ECCD1H030CC	Ceramic	3pF ± 0.25pF	50V
C107	ECCD1H070CC	Ceramic	7pF ± 0.25pF	50V
C109	ECKD1H103PF2	Ceramic	0.01μF +100%,–0%	50V
C111	ECKD1H103PF2	Ceramic	0.01μF +100%,–0%	50V
C112	ECCD1H330J	Ceramic	33pF ± 5%	50V
C113	ECCD1H330J	Ceramic	33pF ± 5%	50V
C114	ECCD1H121JU	Ceramic	120pF ± 5%	50V
C115	ECKD1H102KB2	Ceramic	1000pF ± 10%	50V
C121	ECKD1H103PF2	Ceramic	0.01μF +100%,–0%	50V
C123	ECKD1H103PF2	Ceramic	0.01μF +100%,–0%	50V
C131	ECEA0JS331	Electrolytic	330μF	6.3V
C132	ECEA0JS221	Electrolytic	220μF	6.3V
C133	ECEA25Z4R7	Electrolytic	4.7μF	25V
C141	ECFWE683KDY	Ceramic	0.068μF ± 10%	50V
C142	ECKD1H681KB2	Ceramic	680pF ± 10%	50V
C143	ECFWD152KBY	Ceramic	1500pF ± 10%	25V
C144	ECEA0JS221	Electrolytic	220μF	6.3V
				6.3V
C182	ECFWD103KBY	Ceramic	0.01μF ± 10%	25V
C183	ECSZ16EF4R7F	Tantal	4.7μF	16V
C184	ECKD1H102KB2	Ceramic	1000pF ± 10%	50V
C200	ECCD1H100DC	Ceramic	10pF ± 0.5pF	50V
C201	ECCD1H820JS2	Ceramic	82pF ± 5%	50V
C202	ECKD1H473ZF	Ceramic	0.047μF +80%,–20%	50V
C203	ECEA0JS331	Electrolytic	330μF	6.3V
C204	ECKD1H103PF2	Ceramic	0.01μF +100%,–0%	50V
C205	ECCD1H820JS2	Ceramic	82pF ± 5%	50V
C206	ECCD1H100DC	Ceramic	10pF ± 0.5pF	50V
C207	ECFWD393KBY	Ceramic	0.093μF ± 10%	25V
C301	ECFWD103KBY	Ceramic	0.01μF ± 10%	25V
C302	ECFWD223KBY	Ceramic	0.022μF ± 10%	25V
C303	ECEA1HS010	Electrolytic	1μF	50V
C304	TCSZ35EFR33	Tantal	0.33μF	35V
C305	ECSZ16EF4R7F	Tantal	4.7μF	16V
C306	ECSZ25EF2R2N	Tantal	2.2μF	25V
C307	ECKD1H102KB2	Ceramic	1000pF ± 10%	50V
C308	ECEA0JS330	Electrolytic	33μF	6.3V
C309	ECEA0JS102	Electrolytic	1000μF	6.3V
C310	ECFWD473KBY	Ceramic	0.047μF ± 10%	25V
C311	ECEA0JS471	Electrolytic	470μF	6.3V
C312	ECEA0JS222	Electrolytic	2200μF	6.3V
C313	ECFWD473KBY	Ceramic	0.047μF ± 10%	25V
C401	ECFWD273KBY	Ceramic	0.027μF ± 10%	25V
C402	ECEA50ZR47	Electrolytic	0.47μF	50V
C403	ECCD1H101K	Ceramic	100pF ± 10%	50V
C404	ECQM05153JZ	Polyester	0.015μF ± 5%	50V
C405	ECQM05183JZ	Polyester	0.018μF ± 5%	50V
C406	ECCD1H121J	Ceramic	120pF ± 5%	50V
C407	ECQM05273JZ	Polyester	0.027μF ± 5%	50V
C408	ECEA1ES4R7	Electrolytic	4.7μF	25V
C409	ECEA0JS471	Electrolytic	470μF	6.3V
C410	ECQM05153JZ	Polyester	0.015μF ± 5%	50V
C411	ECQM05472JZ	Polyester	4700pF ± 5%	50V
C412	ECQS1472JWT	Styrol	4700pF ± 5%	100V

Ref. No.	Part No.	Description		
C423	ECEA0JS102	Electrolytic	1000μF	6.3V
C431	ECKD2H102KB2	Ceramic	1000pF ± 10%	500V
C432	ECQM2223KZ	Polyester	0.022μF ± 10%	200V
C437	ECKD2H102KB2	Ceramic	1000pF ± 10%	500V
C439	ECQM2333KZ	Polyester	0.033μF ± 10%	200V
C441	ECQE6223KZ	Polyester	0.022μF ± 10%	600V
C442	ECKD2H391KB9	Ceramic	390pF ± 10%	500V
C443	ECEA2AS3R3	Electrolytic	3.3μF	100V
C444	ECEA1HS3R3	Electrolytic	3.3μF	50V
C445	ECKD1H103PF2	Ceramic	0.01μF +100%,–0%	50V
C446	ECQM4823KZ	Polyester	0.082μF ± 10%	400V
C501	ECEA1HS010	Electrolytic	1μF	50V
C502	ECCD1H331J	Ceramic	330pF ± 5%	50V
C503	ECEA0JS470	Electrolytic	47μF	6.3V
C504	ECEA0JS470	Electrolytic	47μF	6.3V
C505	ECEA0JS101	Electrolytic	100μF	6.3V
C506	ECEA0JS221	Electrolytic	220μF	6.3V
C507	ECKD1H102KB2	Ceramic	1000pF ± 10%	50V
C508	ECEA0JS102	Electrolytic	1000μF	6.3V
C509	ECFWD333KBY	Ceramic	0.033μF ± 10%	25V
C711	ECEA1CS222	Electrolytic	2200μF	16V
C712	ECEA1AS221	Electrolytic	220μF	10V
C713	ECEA1AS221	Electrolytic	220μF	10V
C714	ECEA1CS100	Electrolytic	10μF	16V

RESISTORS

R101	ERD25TJ820	Carbon	82Ω	± 5%	1/4W
R102	ERD25TJ680	Carbon	68Ω	± 5%	1/4W
R111	ERD25TJ102	Carbon	1KΩ	± 5%	1/4W
R112	ERD25TJ152	Carbon	1.5KΩ	± 5%	1/4W
R113	ERD25TJ104	Carbon	100KΩ	± 5%	1/4W
R131	ERD25FJ100	Carbon	10Ω	± 5%	1/4W
R140	ERD25TJ101	Carbon	100Ω	± 5%	1/4W
R141	ERD25TJ151	Carbon	150Ω	± 5%	1/4W
R142	ERD25TJ123	Carbon	12KΩ	± 5%	1/4W
R143	ERD25TJ562	Carbon	5.6KΩ	± 5%	1/4W
R144	ERD25TJ102	Carbon	1KΩ	± 5%	1/4W
R145	ERD25TJ221	Carbon	220Ω	± 5%	1/4W
R146	ERD25TJ154	Carbon	150KΩ	± 5%	1/4W
R147	ERD25TJ394	Carbon	390KΩ	± 5%	1/4W
R148	ERD25TJ221	Carbon	220Ω	± 5%	1/4W
R181	ERD25TJ331	Carbon	330Ω	± 5%	1/4W
R182	ERD25TJ473	Carbon	47KΩ	± 5%	1/4W
R183	ERD25TJ123	Carbon	12KΩ	± 5%	1/4W
R184	ERD25TJ123	Carbon	12KΩ	± 5%	1/4W
R187	ERD25TJ102	Carbon	1KΩ	± 5%	1/4W
R188	ERD25TJ472	Carbon	4.7KΩ	± 5%	1/4W
R189	ERD25TJ183	Carbon	18KΩ	± 5%	1/4W
R191	ERD25TJ183	Carbon	18KΩ	± 5%	1/4W
R192	ERD25TJ224	Carbon	220KΩ	± 5%	1/4W
R201	ERD25FJ470	Carbon	47Ω	± 5%	1/4W
R301	ERD25TJ103	Carbon	10KΩ	± 5%	1/4W
R302	ERD25TJ104	Carbon	100KΩ	± 5%	1/4W
R303	ERD25TJ683	Carbon	68KΩ	± 5%	1/4W
R304	ERD25TJ184	Carbon	180KΩ	± 5%	1/4W

Ref. No.	Part No.	Description
R305	ERD25TJ333	Carbon 33KΩ ± 5% 1/4W
R306	ERD25TJ562	Carbon 5.6KΩ ± 5% 1/4W
R307	ERD25TJ472	Carbon 4.7KΩ ± 5% 1/4W
R308	ERD25TJ822	Carbon 8.2KΩ ± 5% 1/4W
R309	ERD25TJ562	Carbon 5.6KΩ ± 5% 1/4W
R310	ERD25FJ1R0	Carbon 1Ω ± 5% 1/4W
R311	ERD25TJ471	Carbon 470Ω ± 5% 1/4W
R312	ERD25TJ101	Carbon 100Ω ± 5% 1/4W
R313	ERD25TJ221	Carbon 220Ω ± 5% 1/4W
R314	ERD25TJ561	Carbon 560Ω ± 5% 1/4W
R401	ERD25TJ122	Carbon 1.2KΩ ± 5% 1/4W
R402	ERD25TJ390	Carbon 39Ω ± 5% 1/4W
R403	ERD25TJ103	Carbon 10KΩ ± 5% 1/4W
R404	ERD25TJ122	Carbon 1.2KΩ ± 5% 1/4W
R405	ERD25TJ183	Carbon 18KΩ ± 5% 1/4W
R406	ERD25FJ470	Carbon 47Ω ± 5% 1/4W
R407	ERD25TJ272	Carbon 2.7KΩ ± 5% 1/4W
R422	ERD25FJ270	Carbon 27Ω ± 5% 1/4W
R423	ERD25TJ680	Carbon 68Ω ± 5% 1/4W
R441	ERD25FJ103	Carbon 10KΩ ± 5% 1/4W
R442	ERD25TJ472	Carbon 4.7KΩ ± 5% 1/4W
R443	ERD25TJ221	Carbon 220Ω ± 5% 1/4W
R444	ERD25TJ184	Carbon 180KΩ ± 5% 1/4W
R445	ERC12GJ475	Solid 4.7MΩ ± 5% 1/2W
R447	ERD25TJ103	Carbon 10KΩ ± 5% 1/4W
R501	ERD25TJ101	Carbon 100Ω ± 5% 1/4W
R502	ERD25FJ5R6	Carbon 5.6Ω ± 5% 1/4W
R503	ERD25TJ221	Carbon 220Ω ± 5% 1/4W
R504	ERD25TJ223	Carbon 22KΩ ± 5% 1/4W
R708	ERD25TJ223	Carbon 22KΩ ± 5% 1/4W
R709	ERD25TJ331	Carbon 330Ω ± 5% 1/4W
R710	ERD25TJ331	Carbon 330Ω ± 5% 1/4W
R711	ERD25TJ101	Carbon 100Ω ± 5% 1/4W
R712	ERD25TJ391	Carbon 390Ω ± 5% 1/4W
R713	ERD25TJ102	Carbon 1KΩ ± 5% 1/4W
R714	ERD25TJ152	Carbon 1.5KΩ ± 5% 1/4W
R716	ERD25TJ562	Carbon 5.6KΩ ± 5% 1/4W
R717	ERD25TJ222	Carbon 2.2KΩ ± 5% 1/4W
R721	ERD25TJ102	Carbon 1KΩ ± 5% 1/4W

CONTROLS

VR19	EVNK4AA00B23	RF AGC	2KΩB
VR31	EVLV0U15KB15	Vert. Hold	100KΩB
VR32	EVNK0AA00B54	Vert. Height	50KΩB
VR41	EVNK0BA00B13	Horiz. Hold	1KΩB
VR62	EVH0TAS20E23	Contrast	2KΩE
VR63	EVLV0U15KB55	Bright.	500KΩB
VR71	EVNK4AA00B53	AVR	5KΩB

OTHER PARTS

TH181	ERTD2ZHL333S	Thermister
X141	EFCS5R5MJ1	5.5MHz Cerap
X142	EFCS6R0MJ1	6.0MHz Cerap
	QJA0149	DC Socket
	TJS868250	3-P Mini. Connector Plug

Ref. No.	Part No.	Description
	TJS868260	4-P Mini. Connector Plug
	TJS868280	6-P Mini. Connector Plug
	TXAJT9P001	9-P Mini. Connector Ass'y
	TXAJT9P002	9-P Mini. Connector Ass'y
	XBA2C16TR0	Fuse 1.6A
	TJC3316	Fuse Holder

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